

**REMARKS**

Claims 1-27 are pending. Claims 20-27 are withdrawn from consideration following a requirement for restriction and an election of claims 1-19, with traverse of the requirement for restriction. When the application is in condition for allowance except for the presence of the withdrawn claims, the withdrawn claims may be canceled by examiner's amendment, without prejudice to applicants' right to file one or more divisional or continuation applications.

We note that the drawings as filed have been accepted, the claim of priority is acknowledged, and the USPTO has received the required certified copies of the priority documentation.

Of the claims considered on the merits, claim 1 is independent and each of claims 2-19 depends directly or indirectly on claim 1. The claims considered on the merits have been amended to overcome the rejections, and favorable reconsideration of the application is respectfully requested.

Claims 4, 6-12, 14 and 16-19 are objected to under 37 CFR 1.75(c) because they are multiple dependent claims dependent on other multiple dependent claims. The claims have been amended to eliminate the multiple dependencies, and withdrawal of the objection is respectfully requested.

Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. The examiner objects to the terms "preferably," "more preferably," "most preferably," "much preferred," "especially," "in particular," "e.g.," "usually at least," the dimension "m," and "in particular according to claim..." and objects also to the recitation of a narrower range within a broader range within the same claim.

The rejection is respectfully traversed on the ground that the terms objected to have

been deleted from the claims. Withdrawal of the rejection is respectfully requested.

Claims 1, 2, 4, 8, 10, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by the article titled "Flame-made ceria nanoparticles" by Mädler et al. The remaining claims considered on the merits, including claim 3, have not been rejected as unpatentable in view of any prior art.

The rejection is respectfully traversed. The rejected claims have all been amended by amended independent claim 1 to define the invention as a combination of features that clearly avoids the Mädler document. The amended claims are directed to a method for the production of a metal oxide. In accordance with this method, at least one metal oxide precursor is dissolved in a high enthalpy carboxylic acid solvent comprising at least one carboxylic acid with a mean carbon content of at least 2.2 carbon atoms in an amount of at least 60 % of the whole solvent to form a solution. The solution is then formed into droplets and flame oxidized.

The claims thus incorporate a feature of claim 3, which is not rejected as unpatentable in view of any prior art. It appears that the examiner agrees that the Mädler document neither discloses nor suggests the invention as defined in the amended claims.

The Mädler document is extensively discussed in the application. At 4:1-9, the specification notes that the Mädler document discloses an FSP (flame spray pyrolysis) method for the production of pure ceria with high surface and homogeneous particle sizes. The specification notes, however, that the previously disclosed system is unsuitable for the production of ceria/zirconia and fails to meet the need for a high temperature method for the production of metal oxides, in particular mixed metal oxides that lead to a product with increased homogeneity of the product.

At 8:1-12, the specification points out that in the production of pure ceria, high enthalpy content is crucial to obtain a homogeneous product. At low enthalpy delivery from

the precursor, insufficient energy is delivered to distribute the metal within the flame. To compare the production of ceria based oxides with Mädler's prior work on ceria as disclosed in the document relied upon in the Office action, pure ceria was prepared from two different precursors with similar enthalpy and the same metal delivery rate in the flame. Table 1 of the application lists the enthalpy of combustion, the flame height, the specific surface area of pure ceria and the XRD diameter obtained by fitting cubic ceria to the spectrum.

At 9:15-24, the specification notes that in the case of pure ceria, a mixture of 40 % iso-octane, 50 % acetic acid and 10 % 2-butanol according to the Mädler publication could dissolve sufficient cerium acetate. However, this resulted in poorer surface stability upon heating compared with ceria prepared according to the present invention and in particular in insufficient storage stability of the solution (phase separation of solvents, evaporation of volatile solvents) such that scale-up is difficult or only to a limited extent possible, this process could not be extended to the synthesis of ceria/zirconia.

At 18:15-23, the specification notes that if the powders obtained according to the present invention are heated for 2 h at 900°C, a clear difference in specific surface area is visible (see Figure 1B of the application). While the preparation disclosed by Mädler et al. in the document relied upon in the Office action results in a product with 28 m<sup>2</sup>/g, the acid based method yields 39 m<sup>2</sup>/g. Thermal treatment stability is associated with uniform morphology. As the specification concludes, this result clearly shows the superior performance of the ceria produced by the method of the invention (see Table 1 of the application).

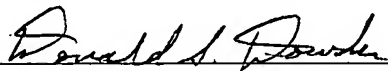
The present invention advances the state of the art considerably beyond the prior teaching of Mädler. Indeed, claims 3, 5-7, 9 and 13-19 are not rejected in view of Mädler or any other prior art. Independent claim 1 as amended recites a combination of features including a feature of original claim 3. It is therefore clear that claim 1, and therefore the other claims considered on the merits, each of which depends directly or indirectly on claim 1, avoid the prior art relied upon in the Office action and are patentable. Withdrawal of the

PATENT  
S.N. 10/602,305  
0796/67688

rejection under 25 U.S.C. 102(b) is respectfully requested.

For the reasons stated, favorable reconsideration of the application is respectfully requested.

Respectfully submitted,  
COOPER & DUNHAM LLP

  
Donald S. Dowden, Reg. No. 20,701  
Attorneys for Applicant